AGENDA
Lower Colorado Regional Water Planning Group
Water Modeling Committee Meeting

LCRA Dalchau Service Center, Room A226
3505 Montopolis Drive, Austin, TX

July 12, 2023, 9:00 a.m.

Committee Meeting:

1. Call to Order – Chair Teresa Lutes
2. Welcome and Introductions – Chair Lutes
3. Receive public comments on specific issues related to agenda items 4 through 6 – limited to 3 minutes per person
4. Overview and discussion of Water Availability Modeling in Regional Water Planning
    a. Purpose and role of committee
    b. TWDB guidelines for surface water availability modeling
    c. Region K Cutoff Model and assumptions used for the previous planning cycle
    d. Potentially needed updates to assumptions for Region K Cutoff Model
    e. Hydrologic variance request to TWDB
    f. Surface water availability modeling in the RWP
5. Next meeting date.
6. Future Agenda Items
7. Public Comments – limited to 3 minutes per person
8. Adjourn

Item 4.
Overview and discussion of Water Availability Modeling in Regional Water Planning

July 12, 2023

9:00

Overview of Water Availability Modeling in Regional Water Planning

REGION K

THE LOWER COLORADO REGIONAL WATER PLANNING GROUP

INTERA

PLUMMER

FREESE AND NICHOLS

Blanton & Associates

Purpose and Role of Water Modeling Committee

DRAFT

- Planning process includes use of water modeling for both surface and groundwater
  - Surface water modeling uses State Water Availability Model (WAM)
    - Modeling done by consultant team with Region K review
  - Groundwater modeling based on State Groundwater Availability Models (GAMs)
    - Modeling done by Groundwater Management Area (GMA) consultant with input from Groundwater Conservation Districts (GCD), reviewed and managed by TWDB
- Water Modeling Committee:
  - Reviews and discusses modeling assumptions and results, and
  - Makes recommendations to full Lower Colorado Regional Water Planning Group (LCRWPG - Region K)
  - Most committee efforts are in the surface water modeling arena since Region K consultant performs this modeling work
  - Occasionally groundwater modeling review needs or questions arise

TWDB guidelines for surface water availability modeling

"Estimating how much water there is to meet water demands is a two-step process that examines both water availability and existing water supply. Those two terms have very specific meanings in the water planning process.

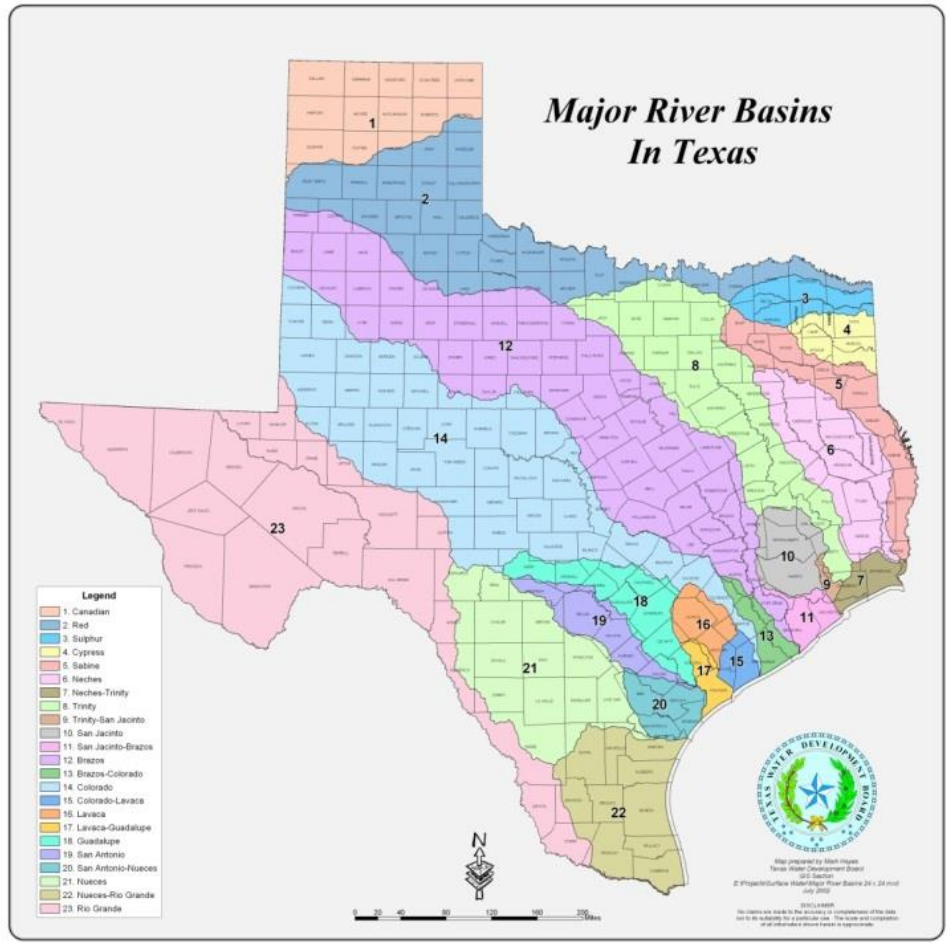
Water availability in regional water planning refers to the maximum amount of raw water that could be produced by/at a water source (such as a reservoir or aquifer) during a repeat of the drought of record. Availability volumes are not effected by whether the supply is actually being used (i.e., connected to or legally authorized for use by a specific WUG).

Existing water supply is the maximum amount of water that is physically and legally accessible from existing sources for immediate use by a WUG, under drought of record conditions. This is a subset of the water availability volume that a WUG already has legal access to as well as the infrastructure in place to treat and deliver the water. Existing water supplies associated with a particular source cannot exceed the total availability for that same source."

Source: First Amended General Guidelines for Development of the 2026 Regional Water Plans, October 2022 (link)

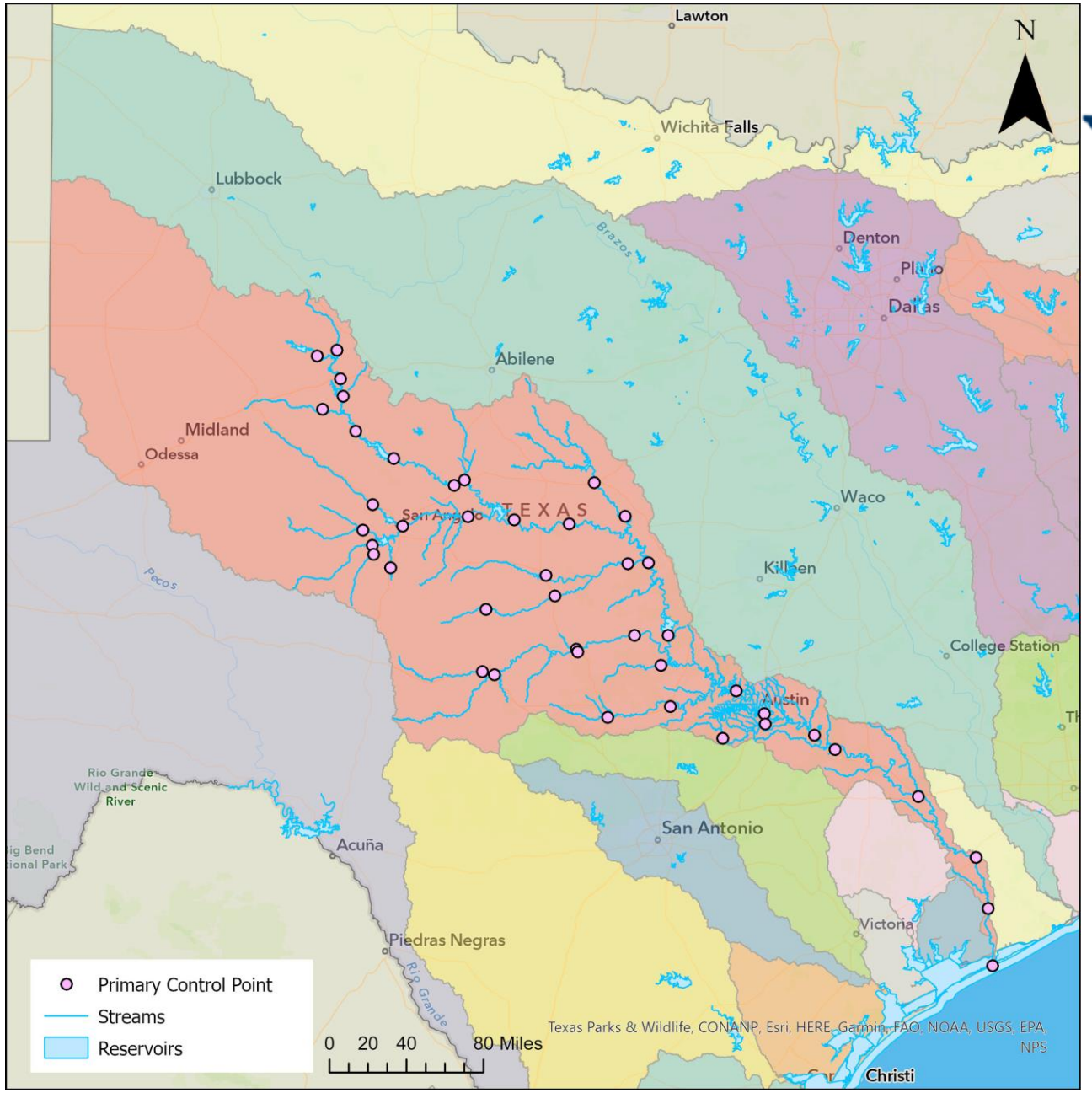
TCEQ WAM Program

- In 1997, Senate Bill 1 authorized development of new models for all basins
  - Managed by TCEQ
  - Developed largely by consultants
  - Uses the Water Rights Analysis Package (WRAP) computer model
  - Used by TCEQ to evaluate new permit applications
  - 23 basins, 20 WAMs
- **TWDB requires use for regional water planning**



Colorado Basin WAM

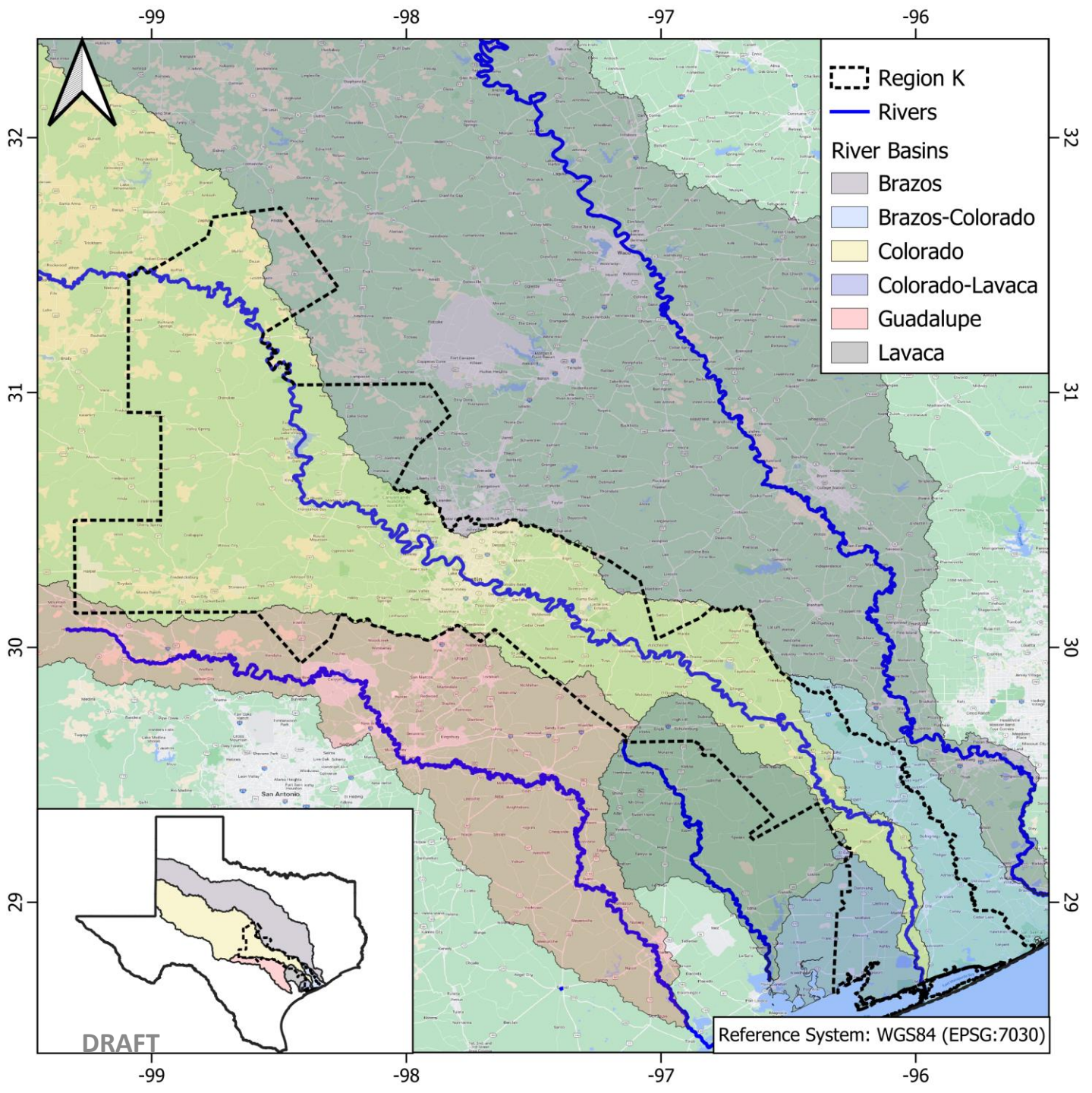
- 42,318 square miles
- 31 major reservoirs
- 43 primary control points in the Colorado Basin
- Mostly Regions F and K



DRAFT

Colorado Basin WAM

- Region K extends across Brazos, Brazos-Colorado Coastal, Colorado, Colorado-Lavaca Coastal, Lavaca, and Guadalupe River Basins
- Most of Region K in Colorado Basin
- Multiple versions & runs
  - TCEQ full authorization and current conditions runs
  - Planning WAMs (LCRA and Austin)
  - Region K WAMs



Region K Colorado WAM Features

- “No call” or cut-off model assumption
- No return flows (except as a Water Management Strategy)
- LCRA Water Management Plan
  - Current (as approved in 2020)
  - Adjustments for future decades
- Other agreements
  - LCRA-STP
  - LCRA-Austin

Three Versions of Region K Colorado WAM used in Regional Water Planning

Ch. 3 Supply Evaluation

Existing Supplies

- No call (cutoff) assumptions
- No interruptible supplies
- Buchanan/Travis firm yield
- 33,400 ac-ft/yr firm supply dedicated to environment

Ch. 5 Water Management Strategy Evaluation

New Appropriations

- TCEQ Run 3
- Priority analysis
- Current LCRA WMP – interruptible supplies and environmental flow support

Other Strategies

- No call (cutoff) assumptions
- Adjustment for future LCRA WMP and other agreements

Discuss Potential Needed Updates to Assumptions for Region K Cutoff WAM

DRAFT

- Review Region K modeling assumptions from 2021 Plan Cycle and discuss potential needed updates

TABLE A
SUMMARY OF REGION K CUTOFF MODEL MODELING ASSUMPTIONS REGARDING SUPPLY AND STRATEGY ANALYSES FOR 2021 REGIONAL PLAN DEVELOPMENT

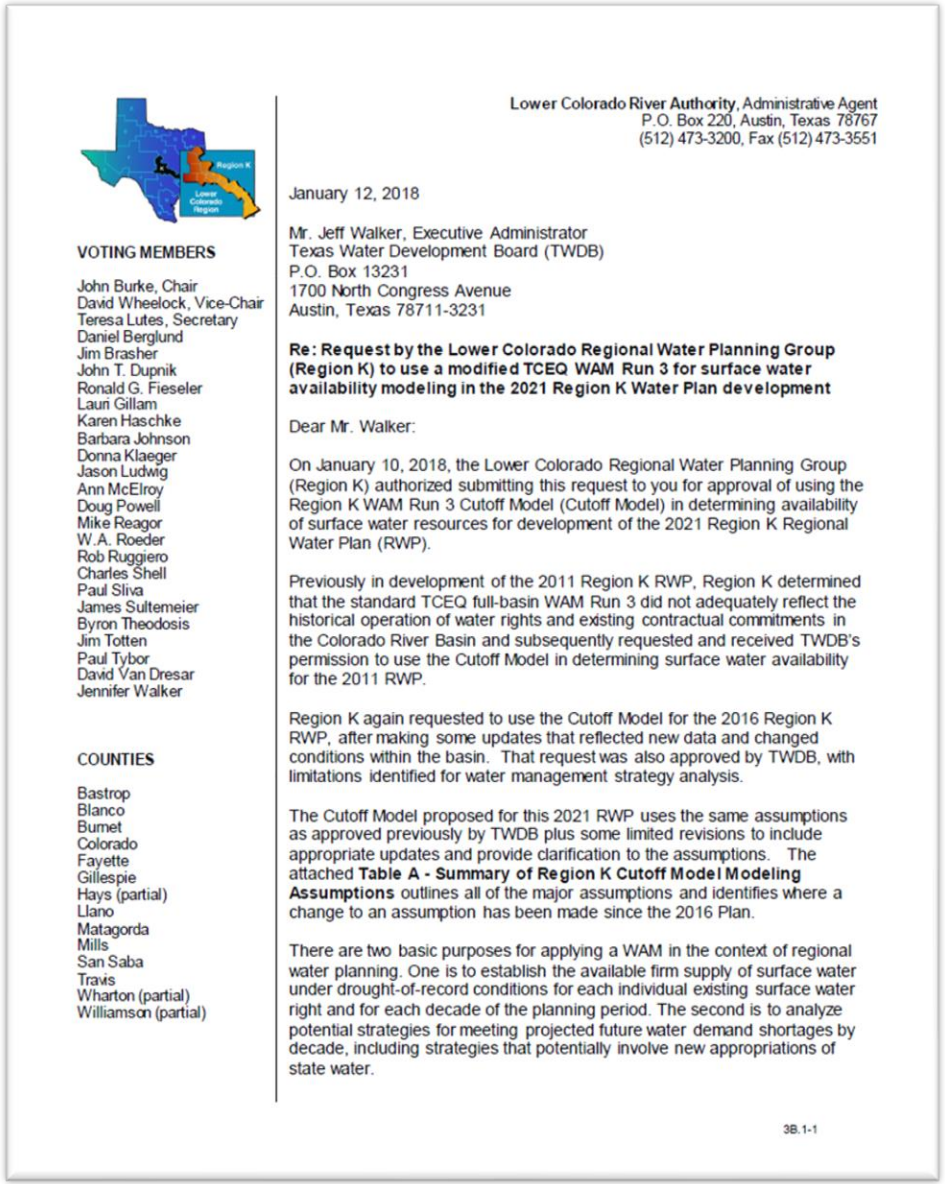
NO.	ASSUMPTION	(1) SUPPLY ANALYSIS	(2) STRATEGY ANALYSIS	(3)	Change from 2016 Planning Cycle
		Region K Cutoff Model by Decade	TCEQ Full-Basin WAM Run 3	Region K Cutoff Model by Decade	
1	Use TCEQ Full-Basin WAM Run 3 Without Modification for New Appropriation Water Supply Strategies Analysis	No	Yes	No	No Change
2	All Rights at and Above Ivie/Brownwood Senior to Downstream Rights (maintaining relative date priority in rights upstream)	Yes	No	Yes	No Change
3	Use Expanded 1940-2016 Naturalized Flows	Yes	No	Yes	Extended hydrology period to 2016
4	Determine Firm Yield for Buchanan-Travis Reservoir System	Yes	No	No	No Change
5	Use Sediment-Adjusted Future Reservoir Storage by Decade	Yes	No	Yes	No Change
6	Use 2015 Water Management Plan Environmental Flow Criteria	No*	Yes	Yes	Changed "2010" to "2015"; Added a footnote for clarification
7	Set All Water Right Demands at Authorized Diversion Amounts	Yes	Yes	No	No Change
8	Include Provisions of LCRA-STP 2006 Settlement Agreement	Yes	No	Yes	No Change
9	Include Operating Rules for Lakes Buchanan and Travis to Reflect Combined Firm Yield Operation	Yes	Yes	Yes	Revised "Maintain Consistent Levels of Drawdown in the Lakes" to say "Reflect Combined Firm Yield Operations"
10	Include Latest Approved LCRA Permits and Amendments (as of December 2017)	Yes	Yes	Yes	Added "(as of December 2017)"
11	Include 2015 Water Management Plan Highland Lakes Interruptible Water	No	Yes	Yes	Changed "2010" to "2015"
12	Adjust 2015 Water Management Plan Environmental Flow Triggers (Decadal)	No	No	Yes	Changed "2010" to "2015"; Added "(Decadal)" for clarification
13	Set All Region K Municipal and Industrial Water Right Demands at Projected Future Demand Amounts by Decade	No	No	Yes	Expanded "M&I" to "Municipal and Industrial" for clarification
14	Modify Curtailment of Highland Lakes Interruptible Water as Necessary to Satisfy LCRA Future Firm Municipal and Industrial Demands	No	No	Yes	Expanded "M&I" to "Municipal and Industrial" for clarification
15	Set LCRA Lower Basin Irrigation Demands Equal to Projected Future Demands by Decade	No	No	Yes	Removed "Weather Variable" after the word "Future"
16	Include LCRA Irrigation Return Flows to the Colorado River	No	No	Only As A Strategy	No Change
17	Include Return Flows from Austin Wastewater Treatment Plants	No	Only As A Strategy	Only As A Strategy	No Change
18	Include Other Municipal and Industrial Return Flows	No	Only As A Strategy	Only As A Strategy	Expanded "M&I" to "Municipal and Industrial" for clarification
19	Include Reuse Provisions and Environmental Flow Requirements of LCRAAustin 2007 Settlement Agreement	No	Only As A Strategy	Only As A Strategy	No Change

* The LCRA 2015 Water Management Plan states that the amount of firm water allocated for environmental purposes is 33,440 acre-feet per year (10-year average). This amount is a commitment from the firm yield of the Highland Lakes.

Note: TCEQ SB-3 requirements will be taken into consideration in strategies involving a new appropriation of water.

January 5, 2018

Hydrologic variance request to TWDB



VOTING MEMBERS

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John T. Dupnik
Ronald G. Fieseler
Lauri Gillam
Karen Haschke
Barbara Johnson
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Jason Ludwig
Ann McElroy
Doug Powell
Mike Reagor
W.A. Roeder
Rob Ruggiero
Charles Shell
Paul Sliva
James Sultemeier
Byron Theodosis
Jim Totten
Paul Tybor
David Van Dresar
Jennifer Walker

COUNTIES

Bastrop
Blanco
Burnet
Colorado
Fayette
Gillespie
Hays (partial)
Llano
Matagorda
Mills
San Saba
Travis
Wharton (partial)
Williamson (partial)

Lower Colorado River Authority, Administrative Agent
P.O. Box 220, Austin, Texas 78767
(512) 473-3200, Fax (512) 473-3551

January 12, 2018

Mr. Jeff Walker, Executive Administrator
Texas Water Development Board (TWDB)
P.O. Box 13231
1700 North Congress Avenue
Austin, Texas 78711-3231

Re: Request by the Lower Colorado Regional Water Planning Group (Region K) to use a modified TCEQ WAM Run 3 for surface water availability modeling in the 2021 Region K Water Plan development

Dear Mr. Walker:

On January 10, 2018, the Lower Colorado Regional Water Planning Group (Region K) authorized submitting this request to you for approval of using the Region K WAM Run 3 Cutoff Model (Cutoff Model) in determining availability of surface water resources for development of the 2021 Region K Regional Water Plan (RWP).

Previously in development of the 2011 Region K RWP, Region K determined that the standard TCEQ full-basin WAM Run 3 did not adequately reflect the historical operation of water rights and existing contractual commitments in the Colorado River Basin and subsequently requested and received TWDB's permission to use the Cutoff Model in determining surface water availability for the 2011 RWP.

Region K again requested to use the Cutoff Model for the 2016 Region K RWP, after making some updates that reflected new data and changed conditions within the basin. That request was also approved by TWDB, with limitations identified for water management strategy analysis.

The Cutoff Model proposed for this 2021 RWP uses the same assumptions as approved previously by TWDB plus some limited revisions to include appropriate updates and provide clarification to the assumptions. The attached **Table A - Summary of Region K Cutoff Model Modeling Assumptions** outlines all of the major assumptions and identifies where a change to an assumption has been made since the 2016 Plan.

There are two basic purposes for applying a WAM in the context of regional water planning. One is to establish the available firm supply of surface water under drought-of-record conditions for each individual existing surface water right and for each decade of the planning period. The second is to analyze potential strategies for meeting projected future water demand shortages by decade, including strategies that potentially involve new appropriations of state water.

Item 4.e.
Hydrologic Variance Request documentation, 2021 Region K Water Plan

APPENDIX 3B

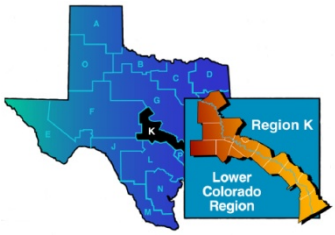
DESCRIPTION OF REGION K WAM RUN 3 CUTOFF MODEL

3B.1 HYDROLOGIC VARIANCE REQUEST TO TWDB

3B.2 HYDROLOGIC VARIANCE – FOLLW-UP QUESTIONS FROM TWDB AND REGION K RESPONSES

3B.3 TWDB HYDROLOGIC VARIANCE APPROVAL LETTER

3B.4 CURRENT AND PROJECTED ELEVATION-AREA-CAPACITY RELATIONSHIPS FOR LAKES TRAVIS AND BUCHANAN ON THE COLORADO RIVER, TEXAS



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The Cutoff Model proposed for this 2021 RWP uses the same assumptions as approved previously by TWDB plus some limited revisions to include appropriate updates and provide clarification to the assumptions. The attached **Table A - Summary of Region K Cutoff Model Modeling Assumptions** outlines all of the major assumptions and identifies where a change to an assumption has been made since the 2016 Plan.

There are two basic purposes for applying a WAM in the context of regional water planning. One is to establish the available firm supply of surface water under drought-of-record conditions for each individual existing surface water right and for each decade of the planning period. The second is to analyze potential strategies for meeting projected future water demand shortages by decade, including strategies that potentially involve new appropriations of state water.

Our understanding of the application and use of WAMs for these different purposes in the Region K planning process is described in the following sections.

REGION K SUPPLY ANALYSES

Region K requests to perform water supply availability analyses using the Cutoff Model. This Cutoff Model reflects historical and current water management operations in the basin with regard to existing water rights, and as such, it provides the most realistic representation of available water supplies during drought-of-record conditions for individual water rights. The basic assumptions included in this model as it is to be applied for purposes of the supply analyses for Region K are identified in the attached **Table A column 1**. The basic assumptions that differ from those included in the standard TCEQ Colorado WAM Run 3 are as follows:

1. All water rights at and above Lakes O.H. Ivie and Brownwood are senior to downstream water rights (while maintaining relative date priority in rights upstream). This assumption reflects historical and current water management operational practices between the upper and lower Colorado Basin, and allows for increased water availability upstream of Lakes O.H. Ivie and Brownwood in Region F and decreased availability downstream in Region K.
2. Expand the period of naturalized flows to include 1940-2016. Extending the hydrology period to 2016 will allow for better analysis of the recent drought and may identify a new "drought of record".
3. Calculation of the firm yield for the Buchanan-Travis Reservoir System. These two reservoirs are operated as a system, and their firm yield should be determined as such.
4. Include provisions of LCRA-STP 2006 Settlement Agreement. This is an agreement that is not included in the TCEQ WAM Run 3, but is representative of current water management operations in the basin.
5. The 2015 LCRA Water Management Plan environmental flow criteria is not used for water supply analysis. An amount of firm water (33,440 AFY) is allocated per year, and is a commitment from the firm yield of the Highland Lakes.
6. 2015 LCRA Water Management Plan Interruptible Water is turned off for water supply analysis.

As noted, it is our understanding that estimates of future drought-of-record surface water supplies for specific water rights are to be made by decade through the year 2070 assuming that reservoir capacities will be gradually reduced over time due to sedimentation. The changing reservoir capacities would be the only variables in these simulations of future supply quantities.

REGION K STRATEGY ANALYSES

The analysis of potential surface water supply strategies can involve different WAM modeling approaches depending on the nature of a particular strategy and the purpose for which the analysis is being made. First and foremost, for a strategy that represents a new appropriation of surface water from TCEQ, the amount of water that the strategy is capable of producing under drought-of-record conditions should be determined under the same permitting assumptions

used by TCEQ. This means that the strategy should be analyzed using TCEQ's standard full-basin WAM Run 3 as it currently exists with all existing water rights in the entire Colorado River Basin fully exercised in accordance with their authorized impoundment and diversion amounts and with no return flows. The result of this analysis will define a reasonable estimate of the legal quantity of water available from implementing the strategy, and this will be the maximum amount of water that can be relied upon for the strategy in the Region K planning process. The basic assumptions included in this WAM Run 3 model as it is to be applied for purposes of analyzing new surface water appropriations for potential Region K strategies also are identified in the attached **Table A column 2**.

The other important application of a WAM for strategy analysis involves the evaluation of how a particular water supply strategy will serve to meet the projected future water demands of a particular water user over time on a decade-by-decade basis through 2070. This is fundamental to the regional water planning process, and according to TWDB guidance, should reflect realistic future conditions. In this regard, the Cutoff Model provides the most useful tool for making these evaluations since it reflects historical and current water management operational practices between the upper and lower Colorado Basin with regard to existing water rights and provides the most realistic representation of water availability during drought-of-record conditions for individual water rights.

For the strategy evaluations undertaken in support of the Region K planning process, the effects of different types of water supply strategies can be incorporated into the Cutoff Model in terms of new supplies, including strategies such as a new groundwater source, an aquifer storage-recovery project, seawater or brackish groundwater desalinization, indirect reuse of return flows, an interbasin surface water or groundwater transfer, or a new surface water appropriation. Once included in the Cutoff Model, these new sources of supply then would be available to meet the projected demands for specific surface water users at different decades in the future. These simulations with the Cutoff Model would be made for specific decadal conditions with regard to the water demands of individual surface water users and with regard to reservoir storage capacities as influenced by future sedimentation. For a strategy involving a new appropriation of surface water, the maximum amount of water available under the strategy would be limited to that amount determined from the previous analysis of the strategy using TCEQ's standard full-basin WAM Run 3 model under fully-authorized water rights conditions. This would ensure that the available supply of water relied upon from the strategy for planning purposes would be consistent with the legal amount of water that could potentially be permitted by TCEQ. While the specific assumptions incorporated in the Cutoff Model for these types of strategy planning simulations may vary depending on the particular strategies being evaluated, the basic assumptions are listed in the attached **Table A column 3**.

CONCLUSION

We believe that the WAM modeling approach outlined above is consistent with directives from TWDB regarding regional water planning and meets the requirements of TCEQ with regard to how strategies involving potential new appropriations of surface water are analyzed and represented in the regional planning process. Furthermore, we believe that this approach will provide the most realistic estimates of future available surface water supplies that reflect actual water management operations in the basin with regard to existing water rights.

We appreciate your consideration of this submittal. If you have any questions about this request, please contact me as shown below.

Respectfully submitted,

John E. Burke
Region K Chairman
512-914-3474
JohnEBurke@RegionK.org

Enclosures: Table A - Summary of Region K Cutoff Model Modeling Assumptions

Cc: Lann Bookout, TWDB (electronically)
Teresa Lutes, Region K Water Modeling Committee Chair (electronically)
Jaime Burke, AECOM (electronically)

TABLE A
SUMMARY OF REGION K CUTOFF MODEL MODELING ASSUMPTIONS
REGARDING SUPPLY AND STRATEGY ANALYSES
FOR 2021 REGIONAL PLAN DEVELOPMENT

		(1)	(2)	(3)	
NO.	**ASSUMPTION**	**SUPPLY ANALYSIS**	**STRATEGY ANALYSIS**		**Change from 2016 Planning Cycle**
		Region K Cutoff Model by Decade	**TCEQ Full-Basin WAM Run 3**	**Region K Cutoff Model by Decade**	
1	Use TCEQ Full-Basin WAM Run 3 Without Modification for New Appropriation Water Supply Strategies Analysis	No	Yes	No	No Change
2	All Rights at and Above Ivie/Brownwood Senior to Downstream Rights (maintaining relative date priority in rights upstream)	Yes	No	Yes	No Change
3	Use Expanded 1940-2016 Naturalized Flows	Yes	No	Yes	Extended hydrology period to 2016
4	Determine Firm Yield for Buchanan-Travis Reservoir System	Yes	No	No	No Change
5	Use Sediment-Adjusted Future Reservoir Storage by Decade	Yes	No	Yes	No Change
6	Use 2015 Water Management Plan Environmental Flow Criteria	No*	Yes	Yes	Changed "2010" to "2015"; Added a footnote for clarification
7	Set All Water Right Demands at Authorized Diversion Amounts	Yes	Yes	No	No Change
8	Include Provisions of LCRA-STP 2006 Settlement Agreement	Yes	No	Yes	No Change
9	Include Operating Rules for Lakes Buchanan and Travis to Reflect Combined Firm Yield Operation	Yes	Yes	Yes	Revised "Maintain Consistent Levels of Drawdown in the Lakes" to say "Reflect Combined Firm Yield Operations"
10	Include Latest Approved LCRA Permits and Amendments (as of December 2017)	Yes	Yes	Yes	Added "(as of December 2017)"
11	Include 2015 Water Management Plan Highland Lakes Interruptible Water	No	Yes	Yes	Changed "2010" to "2015"
12	Adjust 2015 Water Management Plan Environmental Flow Triggers (Decadal)	No	No	Yes	Changed "2010" to "2015"; Added "(Decadal)" for clarification
13	Set All Region K Municipal and Industrial Water Right Demands at Projected Future Demand Amounts by Decade	No	No	Yes	Expanded "M&I" to "Municipal and Industrial" for clarification
14	Modify Curtailment of Highland Lakes Interruptible Water as Necessary to Satisfy LCRA Future Firm Municipal and Industrial Demands	No	No	Yes	Expanded "M&I" to "Municipal and Industrial" for clarification
15	Set LCRA Lower Basin Irrigation Demands Equal to Projected Future Demands by Decade	No	No	Yes	Removed "Weather Variable" after the word "Future"
16	Include LCRA Irrigation Return Flows to the Colorado River	No	No	Only As A Strategy	No Change
17	Include Return Flows from Austin Wastewater Treatment Plants	No	Only As A Strategy	Only As A Strategy	No Change
18	Include Other Municipal and Industrial Return Flows	No	Only As A Strategy	Only As A Strategy	Expanded "M&I" to "Municipal and Industrial" for clarification
19	Include Reuse Provisions and Environmental Flow Requirements of LCRA-Austin 2007 Settlement Agreement	No	Only As A Strategy	Only As A Strategy	No Change

* The LCRA 2015 Water Management Plan states that the amount of firm water allocated for environmental purposes is 33,440 acre-feet per year (10-year average). This amount is a commitment from the firm yield of the Highland Lakes.

Note: TCEQ SB-3 requirements will be taken into consideration in strategies involving a new appropriation of water.

Burke, Jaime

From: Lann Bookout <Lann.Bookout@twdb.texas.gov>
Sent: Friday, January 26, 2018 2:00 PM
To: 'johnburke41@gmail.com'; Burke, Jaime
Cc: Temple McKinnon; Sarah Backhouse; Matt Nelson
Subject: Follow-up questions about Region K's Hydrologic Variance Request

John;
Our preliminary review of the Region K hydrologic variance request generated a couple of questions. It would help us more completely understand your request if you could provide some clarification or additional information to the following questions:

1. *Please explain why, per item #6 (or item No. 11, Table A) of the January 12th request, is it proposed that the 2015 LCRA Water Management Plan Interruptible Water be turned off for the existing water supply analysis if the stated intent of Region K's analysis is to "reflect the historical operation of water rights and existing contractual commitments" in the basin? Please explain a) the specific reason/purpose of turning these anticipated water releases off even though, our understanding is that LCRA's management plan requires certain interruptible releases will continue to be made to downstream users (prior to the onset of the occurrence of a drought) based on reservoir elevations and b) what net effect doing so will have on the estimates of existing basin supplies under drought of record conditions, and hence the identified water needs. For example, does excluding these diversions in the modelling result in increasing or decreasing the estimated volume of existing supply that would be actually be expected to be available under actual drought conditions vs incorporating interruptible diversions in the modelling?*

2. Similarly, please also explain why items 12 and 19 in Table A (the management plans environmental flow triggers and reuse provisions and environmental flow requirements of LCRA Austin settlement agreement) are also proposed to not be incorporated in modelling analyses of existing supplies. Provide additional information regarding why these items are proposed not to be incorporated into the existing supply analysis and what effect doing so has on estimates of existing basin supplies under DOR conditions vs incorporating these items.

I hope to hear from you soon on this so we can continue our evaluation of your request. Since this is just a clarification to your letter, an email response is sufficient.

Lann Bookout
Project Manager, Regional Water Planning
Texas Water Development Board
Lann.Bookout@twdb.texas.gov
512-936-9439

Burke, Jaime

From: Lann Bookout <Lann.Bookout@twdb.texas.gov>
Sent: Friday, February 09, 2018 11:10 AM
To: 'johnburke41@gmail.com'; Burke, Jaime
Cc: Sarah Backhouse; Temple McKinnon
Subject: Additional questions on Region K's Hydrologic Variance

John:
In the request in the basic assumptions listed 1-6 on page 2. Can you provide some additional explanation on number 4 and 5 shown below:

4. Include provisions of LCRA-STP 2006 Settlement Agreement. This is an agreement that is not included in the TCEQ WAM Run 3, but is representative of current water management operations in the basin.
5. The 2015 LCRA Water Management Plan environmental flow criteria is not used for water supply analysis. An amount of firm water (33,440 AFY) is allocated per year, and is a commitment from the firm yield of the Highland Lakes.

For number 4 - What elements of the agreement affect the modeling of other LCRA water rights and briefly how is the agreement represented in the model?
For number 5 – Please explain the rationale of not including the WMP environmental flow criteria but including 33,440 afy allocation of firm water and how is this applied in the Cutoff model.

I hope to hear from you soon on this and our previous questions so we can continue our evaluation of your request. Since this is
just a clarification to your letter, an email response is sufficient.

Lann Bookout
Project Manager, Regional Water Planning
Texas Water Development Board
Lann.Bookout@twdb.texas.gov
512-936-9439

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Texas Water Development Board
Lann.Bookout@twdb.texas.gov
512-936-9439

Burke, Jaime

From: Burke, Jaime
Sent: Friday, February 16, 2018 5:13 PM
To: 'Lann Bookout'
Cc: Sarah Backhouse; Temple McKinnon; Matt Nelson; 'johnburke41@gmail.com'; Teresa Lutes (External); 'David Wheelock'; Rebecca Batchelder
Subject: RE: Additional questions on Region K's Hydrologic Variance
Attachments: Region_K_Hydrologic_Variance_Request_JAN2018.pdf

Lann,

Thank you for the opportunity to provide clarification to the letter that was submitted related to the hydrologic variance request for Region K. Within this email, we are providing responses for the four questions you have asked, and have attached the original Region K request letter for reference. Please let us know if we can provide any additional information.

From the January 26, 2018 email from TWDB:

1. *Please explain why, per item #6 (or item No. 11, Table A) of the January 12th request, is it proposed that the 2015 LCRA Water Management Plan Interruptible Water be turned off for the existing water supply analysis if the stated intent of Region K's analysis is to "reflect the historical operation of water rights and existing contractual commitments" in the basin? Please explain a) the specific reason/purpose of turning these anticipated water releases off even though, our understanding is that LCRA's management plan requires certain interruptible releases will continue to be made to downstream users (prior to the onset of the occurrence of a drought) based on reservoir elevations and b) what net effect doing so will have on the estimates of existing basin supplies under drought of record conditions, and hence the identified water needs. For example, does excluding these diversions in the modelling result in increasing or decreasing the estimated volume of existing supply that would be actually be expected to be available under actual drought conditions vs incorporating interruptible diversions in the modelling?*

Background

The firm yield of lakes Buchanan and Travis is estimated using a Water Availability Model with all senior water rights fully utilized. The yield from the lakes is included in LCRA's system water supply which is the basis for LCRA entering into long term contracts to supply water to municipal and industrial customers and is the basis of allocations of firm supply made in the regional water planning processes.

A court order in 1988 (1988 Adjudication Order) allows the unused portion of the firm yield to be used for other beneficial purposes, i.e. interruptible water for agricultural irrigation. However, the 1988 Adjudication Order prohibits supplying interruptible water that would impair availability of firm water for municipal and industrial users. The WMP is structured such that some of the unused supply (ie. firm yield) of lakes Buchanan and Travis is made available as interruptible stored water and sold to irrigators for a single irrigation season.

The 1988 Adjudication Order and the water rights for lakes Buchanan and Travis require an operating plan (i.e. Water Management Plan (WMP)) that "LCRA shall interrupt or curtail the supply of water . . . pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demand for . . . firm, uninterruptible water commitments". The 1988 Adjudication Order also calls for the calculation of the firm yield of the combined lakes Buchanan and Travis through a repeat of the drought of record.

LCRA amends the WMP as firm demands increase and this reduces the amount of supply available for interruptible uses. LCRA will continue to amend the WMP over time to ensure that firm demands continue to be met.

Under the operational rules of the WMP and over the course of a multi-year drought, the sum of water supplied to all uses from the lakes (ie. firm and interruptible demands) will not exceed the combined firm yield of lakes Buchanan and Travis. For firm yield modeling purposes, whether water is diverted from the lakes for an interruptible use or a firm use is transparent to the hydrologic calculation.

Response to Question 1.

Response 1.a. Region K specifies the WMP (i.e, interruptible water) be turned off for water supply estimates for these reasons:

- TWDB Regional Planning Rules require (and Region K agrees) that supply estimates be made for firm yield conditions with all water rights fully utilized.

- Imposing the WMP operation onto the supply estimate does not follow the directive to use firm yield. When the WMP is in operation, firm demands on the lakes are less than firm yield, interruptible demands are imposed on the lakes, and downstream water rights are not operated at their fullest authorization. The WMP is subject to revision, and has been revised several times since the first plan was approved in 1989. These revisions address, among other things, increases to firm demands that tend to reduce the amount of water available to interruptible customers. In the context of long-term water planning, the existence of the WMP should not preclude access to the full firm yield of lakes Buchanan and Travis in the future when firm demands begin to approach the firm yield.

Response 1.b: If the Water Management Plan and interruptible stored water was included in the existing water supply analysis (instead of a firm yield model with no interruptible water) the results would tend to be similar. This is because the average annual amount of water that can be supplied from a reservoir system during the critical drought period without going empty is essentially the same regardless of whether the water being diverted consists of some interruptible water and some firm water or consists of all firm water.

2. Similarly, please also explain why items 12 and 19 in Table A (the management plans environmental flow triggers and reuse provisions and environmental flow requirements of LCRA Austin settlement agreement) are also proposed to not be incorporated in modelling analyses of existing supplies. Provide additional information regarding why these items are proposed not to be incorporated into the existing supply analysis and what effect doing so has on estimates of existing basin supplies under DOR conditions vs incorporating these items.

Response to Question 2.

Response 2: Specific environmental flow criteria are required based on the Water Management Plan, and the WMP is subject to change. As the WMP changes, the environmental flow levels (such as subsistence, base-dry and base-average) as well as the manner in which LCRA attempts to attain those flow levels may change. LCRA expects to continue to make water available for environmental flow needs into the future and the LCRA Board has committed a portion of LCRA's firm supply to help meet such needs. When evaluating existing supplies to what demands can be met out into the future, it is appropriate to look at the firm yield model as discussed in the prior response. Out of that firm supply, it is then appropriate to deduct the amount that has been committed out of LCRA's firm supply to help meet environmental flow needs. Meeting environmental flow requirements with an allocation of firm yield does not change the estimated existing basin supply under DOR conditions.

Regarding the 2007 LCRA-Austin Settlement Agreement, the reuse and environmental flow provisions of that agreement address how return flows can be used to help meet environmental flow commitments and potential future supply projects. These provisions are separate and apart from the underlying water rights. The City of Austin and LCRA have a bed and banks permit application pending approval at TCEQ, which would be required to implement a potential future project utilizing that permit. Further, Region K does not include Austin's return flows in estimating water supply availability for regional planning. As discussed in the 2016 Region K water plan, the City of Austin (and Region K) consider Austin's return flows as a resource for future water management strategies and supplies.

And, from the February 9, 2018 email from TWDB:

In the request in the basic assumptions listed 1-6 on page 2. Can you provide some additional explanation on number 4 and 5 shown below:

> 4. Include provisions of LCRA-STP 2006 Settlement Agreement. This is an agreement that is not included in the TCEQ WAM Run 3, but is representative of current water management operations in the basin.
>
> 5. The 2015 LCRA Water Management Plan environmental flow criteria is not used for water supply analysis. An amount of firm water (33,440 AFY) is allocated per year, and is a commitment from the firm yield of the Highland Lakes.

3. Regarding basic assumption number 4 - What elements of the agreement affect the modeling of other LCRA water rights and briefly how is the agreement represented in the model?

Response to Question 3.

In the Region K Cutoff Model, South Texas Project (STP) attempts to divert their full authorized consumptive demand in priority order under CA 14-5437 at the priority date granted in the water right (i.e., June, 1974). There are no elements of the agreement that affect diversions to other LCRA water rights or the modeling of other LCRA water rights.

The LCRA-STP 2006 Settlement Agreement commits LCRA to providing water from storage from lakes Buchanan and Travis in the event STP cannot meet its water needs from CA 14-5437. Stored water from lakes Buchanan and Travis is a "back up" supply to STP and this agreement does not affect other LCRA water rights. This back up supply is a firm water commitment, and is appropriate to include in the model.

4. Regarding basic assumption number 5 – Please explain the rationale of not including the WMP environmental flow criteria but including 33,440 afy allocation of firm water and how is this applied in the Cutoff model.

Response to Question 4.

Refer to Response number 2, above for the rationale of not including the WMP environmental flow criteria in the Cutoff supply model. The allocation of 33,440 acft/yr from the firm yield to meet environmental flows is done as a post-process to the Cutoff model and is treated as an obligation against LCRA's firm supplies.

Thank you,
Jaime

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March 28, 2018

Mr. John Burke, P.E.
Region K Chair
Lower Colorado Regional Water Planning Group (Region K)
17310 Hill Lakes Court
Cypress, Texas 77429

RE: Region K Regional Water Planning Group (RWPG) request for approval to modify existing surface water availability hydrologic assumptions for development of the 2021 Region K Regional Water Plan (RWP)

Dear Mr. Burke:

The Texas Water Development Board (TWDB) has reviewed your requests dated January 12, 2018 to use the Region K Water Availability Model (WAM) Run 3 Cutoff Model. The cutoff model is approved for use in determining current water supply availability and for evaluation of water management strategies in the development of the 2021 Region K RWP.

Your request stated that the cutoff model began with the Texas Commission on Environmental Quality (TCEQ) WAM Run 3 and was modified to more accurately reflect simulation of historic operations and operation of water rights and existing contractual commitments in the Colorado River Basin. The request further indicated that since approved and used in the 2016 Region K plan this version will contain updates and some clarifications. The Region K hydrologic variance request states that TCEQ full-basin WAM Run 3 will be used without modification for any analysis that includes a new appropriation water supply. This letter confirms that the TWDB approves the assumptions that makeup the Region K Cutoff Model for supply and water management strategy analysis for the development of the 2021Region K RWP, as specified in Table A of the request. This table is included as Attachment 1 to this letter.

While the TWDB authorizes these modifications to evaluate existing water supplies and water management strategies for development of the 2021 Region K RWP, it is the responsibility of the planning group to ensure that the resulting estimates of water availability are reasonable for drought planning purposes and will reflect conditions expected in the event of actual drought conditions; and in all other regards will be evaluated in accordance with the contract Exhibit C, *General Guidelines for Fifth Cycle of Regional Water Plan Development.*

If you have any questions, please do not hesitate to contact Lann Bookout, project manager for Region K, at 512-936-9439 or via email at lann.bookout@twdb.texas.gov.

Sincerely,

Jeff Walker
Executive Administrator

Attachment: Table A

c w/att: David Wheelock, Administrator
Jaime Burke, Consultant
Lann Bookout, Project Manager

TABLE A
SUMMARY OF REGION K CUTOFF MODEL MODELING ASSUMPTIONS
REGARDING SUPPLY AND STRATEGY ANALYSES
FOR 2021 REGIONAL PLAN DEVELOPMENT

		(1)	(2)	(3)	
NO.	ASSUMPTION	SUPPLY ANALYSIS	STRATEGY ANALYSIS		Change from 2016 Planning Cycle
		Region K Cutoff Model by Decade	TCEQ Full-Basin WAM Run 3	Region K Cutoff Model by Decade	
1	Use TCEQ Full-Basin WAM Run 3 Without Modification for New Appropriation Water Supply Strategies Analysis	No	Yes	No	No Change
2	All Rights at and Above Ivie/Brownwood Senior to Downstream Rights (maintaining relative date priority in rights upstream)	Yes	No	Yes	No Change
3	Use Expanded 1940-2016 Naturalized Flows	Yes	No	Yes	Extended hydrology period to 2016
4	Determine Firm Yield for Buchanan-Travis Reservoir System	Yes	No	No	No Change
5	Use Sediment-Adjusted Future Reservoir Storage by Decade	Yes	No	Yes	No Change
6	Use 2015 Water Management Plan Environmental Flow Criteria	No*	Yes	Yes	Changed "2010" to "2015"; Added a footnote for clarification
7	Set All Water Right Demands at Authorized Diversion Amounts	Yes	Yes	No	No Change
8	Include Provisions of LCRA-STP 2006 Settlement Agreement	Yes	No	Yes	No Change
9	Include Operating Rules for Lakes Buchanan and Travis to Reflect Combined Firm Yield Operation	Yes	Yes	Yes	Revised "Maintain Consistent Levels of Drawdown in the Lakes" to say "Reflect Combined Firm Yield Operations"
10	Include Latest Approved LCRA Permits and Amendments (as of December 2017)	Yes	Yes	Yes	Added "(as of December 2017)"
11	Include 2015 Water Management Plan Highland Lakes Interruptible Water	No	Yes	Yes	Changed "2010" to "2015"
12	Adjust 2015 Water Management Plan Environmental Flow Triggers (Decadal)	No	No	Yes	Changed "2010" to "2015"; Added "(Decadal)" for clarification
13	Set All Region K Municipal and Industrial Water Right Demands at Projected Future Demand Amounts by Decade	No	No	Yes	Expanded "M&I" to "Municipal and Industrial" for clarification
14	Modify Curtailment of Highland Lakes Interruptible Water as Necessary to Satisfy LCRA Future Firm Municipal and Industrial Demands	No	No	Yes	Expanded "M&I" to "Municipal and Industrial" for clarification
15	Set LCRA Lower Basin Irrigation Demands Equal to Projected Future Demands by Decade	No	No	Yes	Removed "Weather Variable" after the word "Future"
16	Include LCRA Irrigation Return Flows to the Colorado River	No	No	Only As A Strategy	No Change

17	Include Return Flows from Austin Wastewater Treatment Plants	No	Only As A Strategy	Only As A Strategy	No Change
18	Include Other Municipal and Industrial Return Flows	No	Only As A Strategy	Only As A Strategy	Expanded "M&I" to "Municipal and Industrial" for clarification
19	Include Reuse Provisions and Environmental Flow Requirements of LCRAAustin 2007 Settlement Agreement	No	Only As A Strategy	Only As A Strategy	No Change

* The LCRA 2015 Water Management Plan states that the amount of firm water allocated for environmental purposes is 33,440 acre-feet per year (10-year average). This amount is a commitment from the firm yield of the Highland Lakes.

Note: TCEQ SB-3 requirements will be taken into consideration in strategies involving a new appropriation of water.

January 5, 2018